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Abstract

Forms of differentially acting glycoprotein hormones are disclosed. These compositions are of the formula

- 5         $\beta^1-(\text{linker}^1)_m-\alpha-(\text{linker}^2)_n-\beta^2$                     (1);  
          $\beta^1-(\text{linker}^1)_m-\beta^2-(\text{linker}^2)_n-\alpha$                     (2);  
          $\alpha-(\text{linker}^1)_m-\beta^1-(\text{linker}^2)_n-\beta^2$                     (3);  
          $\beta^2 \approx \alpha-(\text{linker})_m-\beta^1$                                 (4); or  
          $\beta^1-(\text{linker})_m-\alpha \approx \beta^2$                                 (5)

- 10        wherein each of  $\beta^1$  and  $\beta^2$  has the amino acid sequence of the  $\beta$  subunit of a vertebrate glycoprotein hormone or a variant of said amino acid sequence, as variants are defined herein. “ $\alpha$ ” designates the  $\alpha$  subunit of a vertebrate glycoprotein hormone or a variant thereof; “linker” refers to a covalently linked moiety that spaces the  $\beta^1$  and  $\beta^2$  subunits at appropriate distances from the  $\alpha$  subunit and from each other. “ $\approx$ ” is a  
15        noncovalent link. Each of m and n is independently 0 or 1.